DNAPL ASSESSMENT
East Street AREA 2 SITE
PITTSFIELD, MASSACHUSETTS

ADDENDUM

HSI GEOTRANS
A TETRA TECH COMPANY
6 Lancaster County Road, Suite Four
Harvard, Massachusetts 01451

October 11, 1999

Corporate Environmental Programs
General Electric Company
100 Woodlawn Avenue, Pittsfield, MA 01201

October 11, 1999

Mr. Bryan Olson
Mr Dean Tagliaferro
Site Evaluation and Response Section (HBR)
U.S. Environmental Protection Agency
One Congress Street
Boston, MA 02203-2211

Mr. Alan Weinberg
Bureau of Waste Site Cleanup
Department of Environmental Protection
436 Dwight Street
Springfield, MA 01103

Re: DNAPL Assessment Addendum, East Street Area 2, US EPA Area 4 / DEP Site Number 1-0146

Dear Mr. Olson, Mr. Tagliaferro and Mr. Weinberg:

Enclosed please find the document entitled *DNAPL Assessment East Street Area 2 Site Pittsfield, Massachusetts, Addendum*. This document has been prepared on behalf of the General Electric Company (GE) by HSI GeoTrans, Inc. It presents the results of additional investigations conducted for GE as proposed in the previously submitted report entitled *DNAPL Assessment East Street Area 2 Site Pittsfield, Massachusetts* (HSI GeoTrans, 1999) and pursuant to the EPA June 28, 1999 conditional approval letter. This addendum report was originally due to the Agencies on September 27, 1999. Due to the difficulties encountered installing the DNAPL recovery test well RW-3(x), an extension to October 12, 1999 was verbally granted by EPA on August 17, 1999.

Please contact me at (413) 494-3952 if you have any comments regarding the enclosed document.

Yours truly,

for

John D. Ciampa
Remediation Project Manager

cc: S. Acree, EPA*
M. Nalipinski, EPA*
R. Child, DEP*
State Representative D. Bosley
J. Bieke, Shea & Gardner *
Mayor G. Doyle
State Representative S. Kelly
State Senator A. Nuciforo
A. Thomas, GE*
M. Carroll, GE
Pittsfield Conservation Commission*
Public Information Repositories
J. Bridge, HSI GeoTrans*
Housatonic River Initiative
R. Bell, DEP*
J. Ziegler, DEP*
L. Cutler, DEP*
State Representative C. Hodgkins
State Representative P. Larkin
J. Gardner, GE
A. Silfer, GE*
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G. Bibler, Goodwin, Procter & Hoar*
D. Veilleux, Roy F. Weston*
ECL I-P-IV(A)(1)* & (2)
Pittsfield Health Department*

(* with enclosure)

DNAPL ASSESSMENT
EAST STREET AREA 2 SITE
PITTSFIELD, MASSACHUSETTS

ADDENDUM

PREPARED FOR:

GENERAL ELECTRIC COMPANY

PREPARED BY:

HSI GEOTRANS, INC.
6 LANCASTER COUNTY ROAD
HARVARD, MASSACHUSETTS 01451

TABLE OF CONTENTS

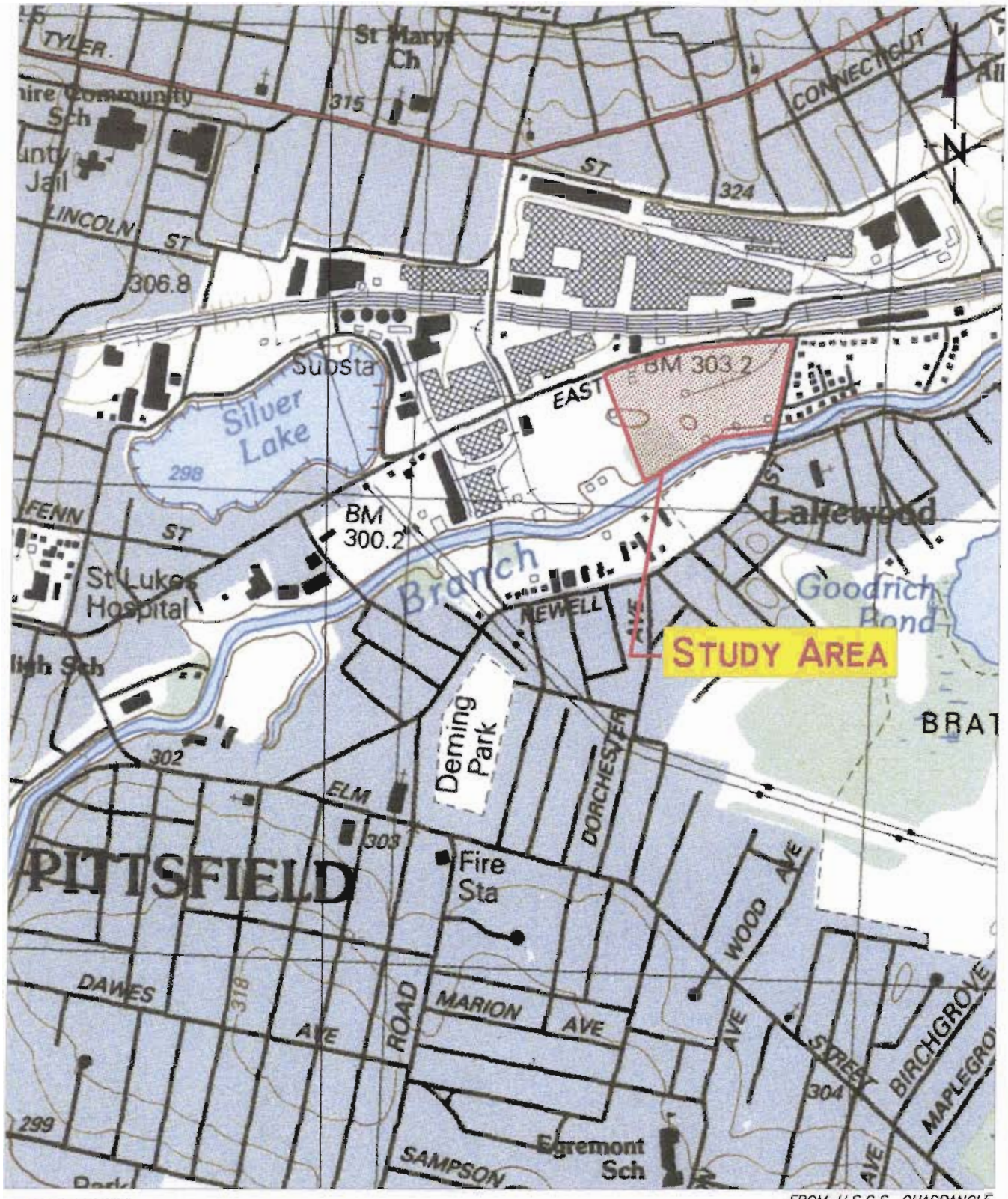
PAGE

LIST OF TABLES

LIST OF FIGURES

1 INTRODUCTION

This report is an addendum to a report previously submitted on behalf of General Electric (GE) entitled DNAPL Assessment, East Street Area 2 Site (HSI GeoTrans, April 1999). Figure 1-1 shows the general location of the portion of the East Street Area 2 site which was subject to this investigation. This addendum presents the results of the investigations proposed in the April 1999 DNAPL Assessment Report and the additional investigations requested by the United States Environmental Protection Agency (EPA) in its June 28, 1999 Conditional Approval of that report. The additional activities conducted for this evaluation include installation of a six-inch diameter dense non-aqueous phase liquid (DNAPL) recovery test well, DNAPL recovery testing from two wells and, as requested in the EPA Conditional Approval letter, further investigation of certain former manufactured gas plant (MGP) equipment. These further investigations of the former MGP equipment included review of historic plans and aerial photographs, two shallow excavations, and a geophysical investigation near existing boring X-19. Two borings were also drilled in and near a former tar separator to evaluate the potential presence of MGP waste in this area. Finally, an additional monitoring well was drilled downgradient of existing boring X-19 to determine if MGP related DNAPL had migrated south from the area of boring X-19.



Contour Interval 3 Meters

National Geodetic Vertical Datum Of 1929

10/11/99

HSI GEOTRANS
A TETRA TECH COMPANY

Figure 1-1 Study Area

2 EVALUATION OF FORMER MANUFACTURED GAS PLANT (MGP) STRUCTURES

As requested by EPA in its June 28, 1999 conditional approval of the April 1999 report entitled, DNAPL Assessment, East Street Area 2 Site, Pittsfield Massachusetts (HSI GeoTrans, 1999), General Electric (GE) has investigated potentially remaining subsurface MGP structures in the vicinity of boring X-19. Based on prior sampling results, boring X-19 apparently encountered MGP waste residues. The 1999 DNAPL assessment report and previous reports submitted by GE stated that boring X-19 had been drilled into the former tar separator. Since the submission of those reports, GE has researched historic survey data, including maps and aerial photographs, and determined that boring X-19 and the tar separator had been incorrectly located on previous maps. In May 1999, GE determined the true location of the former tar separator from as-built plans of the MGP and aerial photographs. The location of the former tar separator was confirmed with a shallow excavation and the extent of the separator walls was mapped using a metal detector and a driven metal rod. Based on the confirmed location of the tar separator, it was determined that boring X-19 was not drilled into the tar separator. The location of the former tar separator was surveyed and other nearby former MGP structures were located from historic plans and aerial photographs. Based on a review of a 1953 aerial photograph, the tar separator was a subsurface structure with an open top. Figure 2-1 is an aerial photograph showing the location of the former tar separator and other MGP structures in the vicinity of boring X-19. A survey plan showing the location of the former MGP structures was prepared by Hill Engineers (Hill, 1999) see Figure 2-2.

Two borings (ESA2-TW-SB-1 and ESA2-TW-SB-2) were drilled on May 27, 1999 to evaluate the potential presence of MGP related waste in and adjacent to the former tar separator. Locations of these new borings are shown on Figure 2-3. The borings were drilled by the direct push method. Continuous samples of the unconsolidated deposits were collected for geologic description and field headspace screening for VOCs was performed with a photo ionization detector (PID). Boring ESA2-TW-SB-1 was drilled to a depth of 14

feet into the tar separator. In order to collect enough sample for chemical analysis from the eight to ten foot depth interval, the sampler was re-advanced at a location approximately one foot from the primary location of boring ESA2-TW-SB-1. During this additional sampling, refusal was encountered at a depth of 9.5 feet.

A second boring, ESA2-TW-SB-2, was drilled to a depth of 16 feet. This boring was located approximately five feet east of the tar separator. Boring logs for the two borings are included in Appendix A.

The material encountered in these borings appeared to be fill. Sheens, tar residues and hydrocarbon odors were observed in the samples collected from both borings. All of the samples collected from boring ESA2-TW-SB-1 were analyzed for polychlorinated biphenyls (PCBs) and the sample which had the highest headspace PID reading (eight to ten foot depth) was analyzed for the Appendix IX+3 constituents. PCB concentrations ranged from non-detect to 7.2 mg/kg. The sample from the eight to ten foot depth contained volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), typically found in MGP residues. Benzene, ethylbenzene, toluene and xylenes (BTEX) were detected at concentrations ranging from 100 to 320 mg/kg. Several polynuclear aromatic hydrocarbons (PAHs) were detected at concentrations ranging from .15 to 1800 mg/kg. Several metals were also detected at concentrations typical for uncontaminated unconsolidated deposits in New England. The results of the chemical analyses of samples from boring ESA2-TW-SB-1 are summarized in Tables 2-1 through 2-5. No analytical samples were collected in ESA2-TW-SB2, since this boring was not within the tar separator.

Since it had been determined that boring X-19 was not drilled into the tar separator, an assessment was made of the location of the former tar de-emulsifier, which was also in the vicinity of boring X-19. On July 16, 1999, two shallow excavations were completed on either side of boring X-19 in an attempt to locate equipment potentially buried at that location. Representatives from Blasland, Bouck & Lee oversaw the excavation and representatives from GE, Berkshire Gas and EPA were also present. The excavations were

advanced to a depth of two to three feet below surface grade. No buried equipment was encountered. As shown on Figure 2-2, the tar de-emulsifier was apparently located just to the south of boring X-19. The 1953 aerial photograph in Figure 2-1 also indicates that the tar de-emulsifier was above ground since a shadow can be observed on the photograph.

To further assess this area and determine whether boring X-19 was drilled into any buried equipment, a ground penetrating radar (GPR) survey was performed by Geophysical Applications, Inc. The location of the GPR survey is shown on Figure 2-3. The GPR survey report is included in Appendix B. No subsurface structures were indicated beneath boring X-19. The GPR survey did identify the potential foundation of the former gas relief holder which was located west of boring X-19. Strong GPR reflections were also noted in the area of the former tar de-emulsifier which may correspond to foundation materials. Two linear GPR reflections, south of boring X-19, were oriented northeast/southwest at a depth of approximately 4.5 feet. About 50 feet south of boring X-19, a small GPR reflection was also noted at a depth of about four feet.

To determine if MGP related DNAPL had migrated south from the area of boring X-19, a monitoring well (E2SC-25) was installed on August 16, 1999, approximately 50 feet downgradient of boring X-19. Figure 2-4 shows this new location and other borings and wells in the portion of the East Street Area 2 site south of East Street. Well ES2C-25 was drilled by the hollow stem auger method. Continuous samples of the unconsolidated deposits were collected by the standard penetration test method (ASTM D1586). Field headspace screening of the samples was done with a PID to screen for VOCs in the samples. Samples with headspace PID readings greater than 10 ppm were screened in the field for the presence of NAPL.

The boring encountered fill (consisting of sand, gravel and coal slag) from the ground surface to five feet; stratified alluvial deposits of sand, silt and gravel from five to 38 feet; and till, consisting of very dense silt, sand and gravel, from 38 to 40 feet. The unconsolidated deposits encountered in E2SC-25 are similar to those observed in other nearby borings and

wells. A sheen was observed in sample SS12 collected from near the water table (19 to 21 feet) and staining, sheens and a trace of non-aqueous phase liquid (NAPL) were observed in the samples collected from between 33 feet and 38 feet. No indications of NAPL were observed in the sample of the till. Subsequent measurements in this well have not shown any DNAPL accumulation. The boring log and well construction diagram for E2SC-25 are included in Appendix A.

Three composite samples of the unconsolidated deposits were collected from the upper fifteen feet in boring E2SC-25. The composite samples were collected from the following intervals: zero to one foot, one to six feet, and six to fifteen feet. In addition to the composite samples, a sample of the unconsolidated deposits from just above the till surface and a sample of the till were collected. All of the samples were analyzed for PCBs. Two discrete samples, SS09 (14 to 15 feet) and SS20 (35 to 37 feet), were analyzed for VOCs. In addition to PCBs, the composite samples from six to 15 feet and 35 to 38 feet were also analyzed for the SVOCs, metals, dioxins and dibenzofurans listed in Appendix IX+3. The sample intervals for VOC and Appendix IX+3 analyses were selected based on the results of the field headspace screening. Low concentrations of PCBs, ranging from non-detect to 3.1 mg/kg, were detected in the samples of the unconsolidated deposits. Four VOCs were detected: cholorobenzene, ethylbenzene, xylene and acetone at concentrations ranging from 0.0077 to 2.5 mg/kg. Several PAHs were also detected at concentrations ranging from 0.17 to 13 mg/kg. In addition to the PAHs, bis(2-ethylhexyl) phthalate was detected at concentrations ranging from 0.15 to 0.29 mg/kg. Dibenzofuran was detected at a concentration of 0.47 mg/kg in the composite sample collected from between six and 15 feet. Several dioxin compounds were detected at low concentrations. Several metals were detected at concentrations typical for uncontaminated unconsolidated deposits in New England. The results of the chemical analyses of the unconsolidated deposit samples are summarized in Tables 2-1 through 2-5.

Based on the results of these additional investigations, it has now been determined that boring X-19 was not drilled into the former tar separator or other former tar processing

equipment. The tar separator and the locations of other MGP structures in the vicinity of boring X-19 have now been accurately located. Data from new monitoring well E2SC-25 indicates that separate phase DNAPL accumulations are not located immediately south (i.e. downslope) of the former MGP equipment in this area.

The results of this assessment were reviewed by representatives of DEP, EPA and GE during an August 26 meeting and the Agencies agreed that no additional remediation activities were necessary at this time in association with the former MGP related equipment.

Table 2-1. Soil PCB Concentrations

Location	Sample Name	Sample Depth (feet)	Compound	Result	Qualifier	Modifier	Units
E2SC-25							
	CS01	0-1					
			Aroclor 1016	ND			mg/kg
			Aroclor 1221	ND			mg/kg
			Aroclor 1232	ND			mg/kg
			Aroclor 1242	ND			mg/kg
			Aroclor 1248	ND			mg/kg
			Aroclor 1254	ND			mg/kg
			Aroclor 1260	3.1			mg/kg
			Total PCBs	**3.1**			
	CS0106	1-6					
			Aroclor 1016	ND			mg/kg
			Aroclor 1221	ND			mg/kg
			Aroclor 1232	ND			mg/kg
			Aroclor 1242	ND			mg/kg
			Aroclor 1248	ND			mg/kg
			Aroclor 1254	ND			mg/kg
			Aroclor 1260	ND			mg/kg
			Total PCBs	**0**			
	CS0615	6-15					
			Aroclor 1016	ND			mg/kg
			Aroclor 1221	ND			mg/kg
			Aroclor 1232	ND			mg/kg
			Aroclor 1242	ND			mg/kg
			Aroclor 1248	ND			mg/kg
			Aroclor 1254	ND			mg/kg
			Aroclor 1260	2.4			mg/kg
			Total PCBs	**2.4**			

Table 2-1. (continued)

Location	Sample Name	Sample Depth (feet)	Compound	Result	Qualifier	Modifier	Units
	CS0615D	6-15					
			Aroclor 1016	ND			mg/kg
			Aroclor 1221	ND			mg/kg
			Aroclor 1232	ND			mg/kg
			Aroclor 1242	ND			mg/kg
			Aroclor 1248	ND			mg/kg
			Aroclor 1254	ND			mg/kg
			Aroclor 1260	2.4			mg/kg
			Total PCBs	**2.4**			
	CS3538	35-38					
			Aroclor 1016	ND			mg/kg
			Aroclor 1221	ND			mg/kg
			Aroclor 1232	ND			mg/kg
			Aroclor 1242	ND			mg/kg
			Aroclor 1248	ND			mg/kg
			Aroclor 1254	ND			mg/kg
			Aroclor 1260	ND			mg/kg
			Total PCBs	**0**			
	CS3540	38-40					
			Aroclor 1016	ND			mg/kg
			Aroclor 1221	ND			mg/kg
			Aroclor 1232	ND			mg/kg
			Aroclor 1242	ND			mg/kg
			Aroclor 1248	ND			mg/kg
			Aroclor 1254	ND			mg/kg
			Aroclor 1260	ND			mg/kg
			Total PCBs	**0**			
ESA2-TW							
	SB-1(0-1)	0 - 1					
			Aroclor 1016	ND			mg/kg
			Aroclor 1221	ND			mg/kg
			Aroclor 1232	ND			mg/kg
			Aroclor 1242	ND			mg/kg
			Aroclor 1248	ND			mg/kg
			Aroclor 1254	ND			mg/kg
			Aroclor 1260	7.2			mg/kg
			Total PCBs	**7.2**			

Table 2-1. (continued)

Location	Sample Name	Sample Depth (feet)	Compound	Result	Qualifier	Modifier	Units
	SB-1(1-2)	1 - 2					
			Aroclor 1016	ND			mg/kg
			Aroclor 1221	ND			mg/kg
			Aroclor 1232	ND			mg/kg
			Aroclor 1242	ND			mg/kg
			Aroclor 1248	ND			mg/kg
			Aroclor 1254	ND			mg/kg
			Aroclor 1260	6.8			mg/kg
			Total PCBs	**6.8**			
	SB-1(2-4)	2 - 4					
			Aroclor 1016	ND			mg/kg
			Aroclor 1221	ND			mg/kg
			Aroclor 1232	ND			mg/kg
			Aroclor 1242	ND			mg/kg
			Aroclor 1248	ND			mg/kg
			Aroclor 1254	ND			mg/kg
			Aroclor 1260	ND			mg/kg
			Total PCBs	**0**			
	SB-1(4-6)	4 - 6					
			Aroclor 1016	ND			mg/kg
			Aroclor 1221	ND			mg/kg
			Aroclor 1232	ND			mg/kg
			Aroclor 1242	ND			mg/kg
			Aroclor 1248	ND			mg/kg
			Aroclor 1254	ND			mg/kg
			Aroclor 1260	ND			mg/kg
			Total PCBs	**0**			
	SB-DUP-1(4-6)	4 - 6					
			Aroclor 1016	ND			mg/kg
			Aroclor 1221	ND			mg/kg
			Aroclor 1232	ND			mg/kg
			Aroclor 1242	ND			mg/kg
			Aroclor 1248	ND			mg/kg
			Aroclor 1254	ND			mg/kg
			Aroclor 1260	ND			mg/kg
			Total PCBs	**0**			

Table 2-1. (continued)

Location	Sample Name	Sample Depth (feet)	Compound	Result	Qualifier	Modifier	Units
	SB-1(6-8)	6 - 8					
			Aroclor 1016	ND			mg/kg
			Aroclor 1221	ND			mg/kg
			Aroclor 1232	ND			mg/kg
			Aroclor 1242	ND			mg/kg
			Aroclor 1248	ND			mg/kg
			Aroclor 1254	ND			mg/kg
			Aroclor 1260	ND			mg/kg
			Total PCBs	**0**			
	SB-1(8-10)	8 - 10					
			Aroclor 1016	ND			mg/kg
			Aroclor 1221	ND			mg/kg
			Aroclor 1232	ND			mg/kg
			Aroclor 1242	ND			mg/kg
			Aroclor 1248	ND			mg/kg
			Aroclor 1254	ND			mg/kg
			Aroclor 1260	ND			mg/kg
			Total PCBs	**0**			
	SB-1(10-14)	10 - 14					
			Aroclor 1016	ND			mg/kg
			Aroclor 1221	ND			mg/kg
			Aroclor 1232	ND			mg/kg
			Aroclor 1242	ND			mg/kg
			Aroclor 1248	ND			mg/kg
			Aroclor 1254	ND			mg/kg
			Aroclor 1260	ND			mg/kg
			Total PCBs	**0**			

Qualifier

ND *Not Detected*

Table 2-2. Detected Soil VOC Concentrations

Location	Sample Name	Sample Depth (feet)	Compound	Result	Qualifier	Modifier	Units
E2SC-25							
	SS09	14-15					
			Chlorobenzene	1.6			mg/kg
			Ethylbenzene	2.5			mg/kg
			Xylenes (total)	0.89			mg/kg
	SS20	35-37					
			Acetone	0.0077	J		mg/kg
			Chlorobenzene	0.0081	J		mg/kg
ESA2-TW							
	SB-1(8-10)	8 - 10					
			Benzene	100			mg/kg
			Ethylbenzene	320			mg/kg
			Toluene	250			mg/kg
			Xylenes (total)	290			mg/kg

Qualifier

J *Result is between Method Detection Limit and Reporting Limit.*

Table 2-3. Detected Soil SVOC Concentrations

Location	Sample Name	Sample Depth (feet)	Compound	Result	Qualifier	Modifier	Units
E2SC-25							
	CS0615	6-15					
			2-Methylnaphthalene	4.1			mg/kg
			4-Aminobiphenyl	0.17	J		mg/kg
			Acenaphthene	0.64			mg/kg
			Acenaphthylene	1.2			mg/kg
			Anthracene	1.4			mg/kg
			Benzo(a)anthracene	2			mg/kg
			Benzo(a)pyrene	1.6			mg/kg
			Benzo(b)fluoranthene	0.91			mg/kg
			Benzo(ghi)perylene	0.49			mg/kg
			Benzo(k)fluoranthene	0.93			mg/kg
			bis(2-Ethylhexyl) phthalate	0.29	J		mg/kg
			Chrysene	1.9			mg/kg
			Dibenz(a,h)anthracene	0.19	J		mg/kg
			Dibenzofuran	0.47			mg/kg
			Fluoranthene	3.6			mg/kg
			Fluorene	2.6			mg/kg
			Indeno(1,2,3-cd)pyrene	0.45			mg/kg
			Naphthalene	2.9			mg/kg
			Phenanthrene	9.4			mg/kg
			Pyrene	6.1			mg/kg
	CS3538	35-38					
			Acenaphthene	0.37			mg/kg
			Acenaphthylene	0.67			mg/kg
			Anthracene	3.6			mg/kg
			Benzo(a)anthracene	3.4			mg/kg
			Benzo(a)pyrene	2.8			mg/kg
			Benzo(b)fluoranthene	1.6			mg/kg
			Benzo(ghi)perylene	0.76			mg/kg
			Benzo(k)fluoranthene	1.3			mg/kg
			bis(2-Ethylhexyl) phthalate	0.16	J		mg/kg
			Chrysene	3.1			mg/kg
			Dibenz(a,h)anthracene	0.23	J		mg/kg
			Fluoranthene	6.2			mg/kg
			Fluorene	0.76			mg/kg

Table 2-3. (continued)

Location	Sample Name	Sample Depth (feet)	Compound	Result	Qualifier	Modifier	Units
			Indeno(1,2,3-cd)pyrene	0.71			mg/kg
			Phenanthrene	9.3			mg/kg
			Pyrene	10			mg/kg
	CS3538D	35-38					
			Acenaphthene	0.52			mg/kg
			Acenaphthylene	1.1			mg/kg
			Anthracene	5.2			mg/kg
			Benzo(a)anthracene	4.4			mg/kg
			Benzo(a)pyrene	4			mg/kg
			Benzo(b)fluoranthene	2.5			mg/kg
			Benzo(ghi)perylene	0.89			mg/kg
			Benzo(k)fluoranthene	1.3			mg/kg
			bis(2-Ethylhexyl) phthalate	0.15		J	mg/kg
			Chrysene	4.2			mg/kg
			Dibenz(a,h)anthracene	0.3		J	mg/kg
			Fluoranthene	8.5			mg/kg
			Fluorene	1			mg/kg
			Indeno(1,2,3-cd)pyrene	0.87			mg/kg
			Phenanthrene	12			mg/kg
			Pyrene	13			mg/kg
ESA2-TW							
	SB-1(8-10)	8 - 10					
			2-Methylnaphthalene	1800			mg/kg
			Acenaphthene	110			mg/kg
			Acenaphthylene	680			mg/kg
			Anthracene	340			mg/kg
			Benzo(a)anthracene	190			mg/kg
			Benzo(a)pyrene	140			mg/kg
			Benzo(b)fluoranthene	100			mg/kg
			Benzo(ghi)perylene	55			mg/kg
			Benzo(k)fluoranthene	38			mg/kg
			Chrysene	180			mg/kg
			Dibenzofuran	59			mg/kg
			Fluoranthene	130			mg/kg
			Fluorene	420			mg/kg
			Indeno(1,2,3-cd)pyrene	59			mg/kg
			Naphthalene	1700			mg/kg
			Phenanthrene	1200			mg/kg

Table 2-3. (continued)

Location	Sample Name	Sample Depth (feet)	Compound	Result	Qualifier	Modifier	Units
			Pyrene	780			mg/kg

Qualifier

J *Result is between Method Detection Limit and Reporting Limit.*

Table 2-4. Detected Soil Dioxin and Dibenzofuran Concentrations

Location	Sample Name	Sample Depth (feet)	Compound	Result	Qualifier	Modifier	Units
E2SC-25							
	CS0615	6-15					
			1,2,3,4,7,8-HxCDF	0.0036	J		µg/kg
			2,3,7,8-TCDF	0.0011	J	g	µg/kg
			OCDD	0.0086	J	B	µg/kg
			OCDF	0.0092	J		µg/kg
			TOTAL HpCDF	0.0042			µg/kg
			TOTAL HxCDF	0.0036			µg/kg
			TOTAL TCDF	0.0062			µg/kg
	CS0615D	6-15					
			1,2,3,4,6,7,8-HpCDD	0.0037	J	B	µg/kg
			1,2,3,4,6,7,8-HpCDF	0.0041	J		µg/kg
			1,2,3,4,7,8,9-HpCDF	0.003	J		µg/kg
			1,2,3,4,7,8-HxCDF	0.0042	J		µg/kg
			2,3,7,8-TCDF	0.0012		g	µg/kg
			OCDD	0.022		B	µg/kg
			OCDF	0.014			µg/kg
			TOTAL HpCDD	0.0072			µg/kg
			TOTAL HpCDF	0.013			µg/kg
			TOTAL HxCDF	0.0042			µg/kg
			TOTAL TCDF	0.0064			µg/kg
	CS3538	35-38					
			1,2,3,4,6,7,8-HpCDD	0.0056		B	µg/kg
			OCDD	0.06		B	µg/kg
			TOTAL HpCDD	0.013			µg/kg
			TOTAL TCDF	0.00098			µg/kg
ESA2-TW							
	SB-1(8-10)	8 - 10					
			1,2,3,4,6,7,8-HpCDD	0.0925			µg/kg
			1,2,3,4,6,7,8-HpCDF	0.0396			µg/kg
			1,2,3,4,7,8,9-HpCDF	0.00637	J		µg/kg
			1,2,3,4,7,8-HxCDF	0.02	J		µg/kg
			2,3,4,6,7,8-HxCDF	0.0148	J		µg/kg
			2,3,4,7,8-PeCDF	0.018			µg/kg
			2,3,7,8-TCDF	0.0566			µg/kg
			HpCDDs (total)	0.0925			µg/kg
			HpCDFs (total)	0.046			µg/kg

Table 2-4. (continued)

Location	Sample Name	Sample Depth (feet)	Compound	Result	Qualifier	Modifier	Units
			HxCDFs (total)	0.0348			µg/kg
			OCDD	0.387			µg/kg
			OCDF	0.0708			µg/kg
			PeCDDs (total)	0.00862			µg/kg
			PeCDFs (total)	0.174			µg/kg
			TCDDs (total)	0.0405			µg/kg
			TCDFs (total)	0.121			µg/kg

Qualifier

B *Compound found in method blank.*

g *2,3,7,8-TCDF results have been confirmed on a DB-225 column.*

J *Result is between Method Detection Limit and Reporting Limit.*

Table 2-5. Detected Soil Metals Concentrations

Location	Sample Name	Sample Depth (feet)	Compound	Result	Qualifier	Modifier	Units
E2SC-25							
	CS0615	6-15					
			Antimony	0.45	B		mg/kg
			Arsenic	7.6			mg/kg
			Barium	11.6	B		mg/kg
			Beryllium	0.17	B		mg/kg
			Cadmium	0.1	B		mg/kg
			Chromium	20.5			mg/kg
			Cobalt	16.4			mg/kg
			Copper	40.2			mg/kg
			Lead	10.1			mg/kg
			Nickel	24.5			mg/kg
			Selenium	0.62			mg/kg
			Silver	0.15	B		mg/kg
			Thallium	1.2			mg/kg
			Vanadium	8.7			mg/kg
			Zinc	68.5			mg/kg
	CS0615D	6-15					
			Antimony	0.29			mg/kg
			Arsenic	7			mg/kg
			Barium	13.1			mg/kg
			Beryllium	0.17			mg/kg
			Cadmium	0.092			mg/kg
			Chromium	20.1			mg/kg
			Cobalt	17.7			mg/kg
			Copper	38.2			mg/kg
			Lead	9.7			mg/kg
			Nickel	26			mg/kg
			Selenium	0.55			mg/kg
			Silver	0.12			mg/kg
			Thallium	1.2			mg/kg
			Vanadium	8.6			mg/kg
			Zinc	69.4			mg/kg
	CS3538	35-38					
			Antimony	0.31	B		mg/kg
			Arsenic	4.3			mg/kg

Table 2-5. (continued)

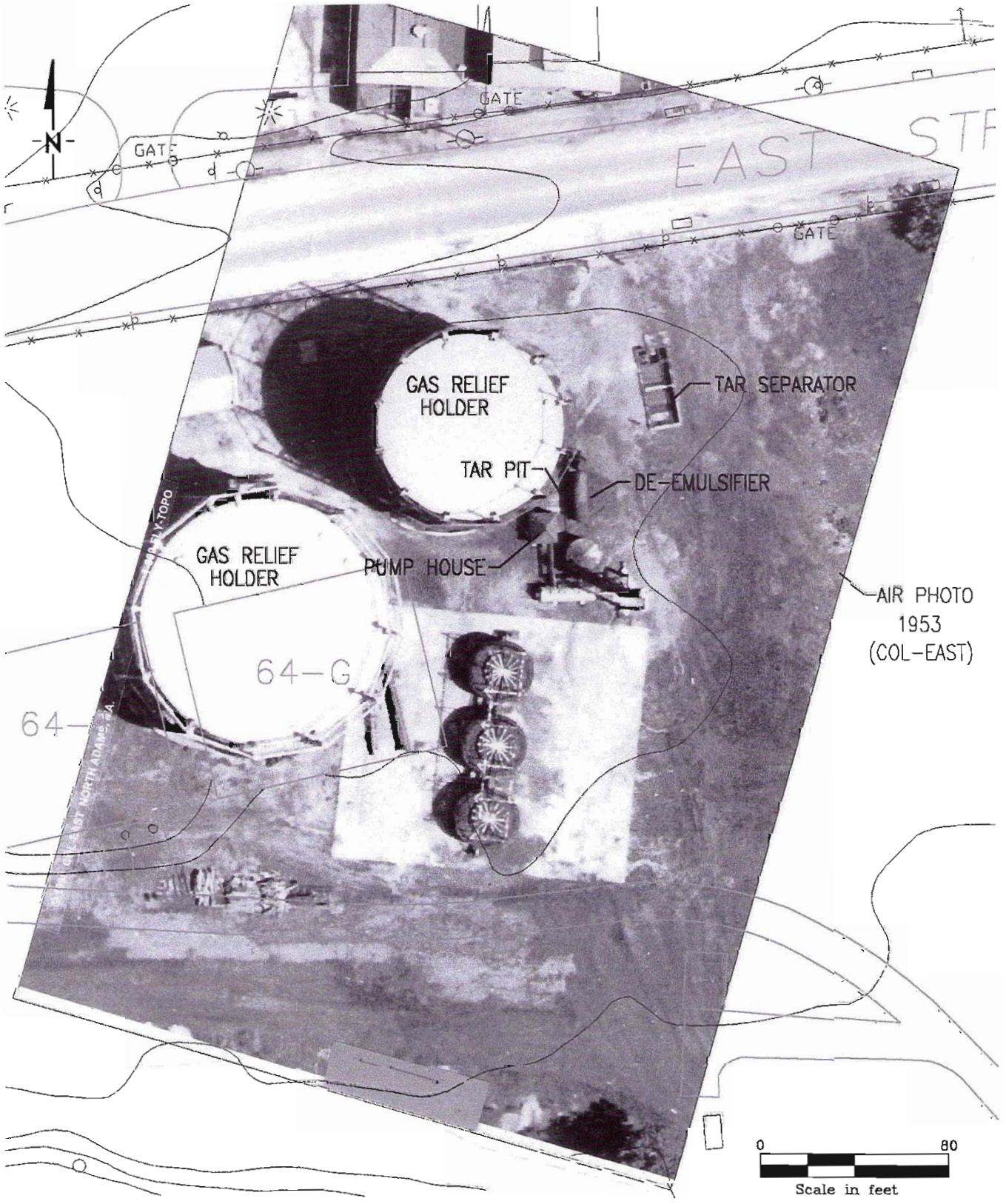
Location	Sample Name	Sample Depth (feet)	Compound	Result	Qualifier	Modifier	Units
			Barium	7.1	B		mg/kg
			Beryllium	0.067	B		mg/kg
			Cadmium	0.048	B		mg/kg
			Chromium	3.4			mg/kg
			Cobalt	6.4			mg/kg
			Copper	16.5			mg/kg
			Lead	5.6			mg/kg
			Nickel	9.1			mg/kg
			Selenium	0.34	B		mg/kg
			Thallium	1.1			mg/kg
			Vanadium	3.6	B		mg/kg
			Zinc	34.6			mg/kg
	CS3538D	35-38					
			Antimony	0.42	B		mg/kg
			Arsenic	4.3			mg/kg
			Barium	8.7	B		mg/kg
			Beryllium	0.11	B		mg/kg
			Cadmium	0.05	B		mg/kg
			Chromium	5.8			mg/kg
			Cobalt	8.6			mg/kg
			Copper	19.6			mg/kg
			Lead	6.1			mg/kg
			Nickel	13.5			mg/kg
			Selenium	0.23	B		mg/kg
			Thallium	0.83	B		mg/kg
			Vanadium	5.7			mg/kg
			Zinc	53			mg/kg
ESA2-TW							
	SB-1(8-10)	8 - 10					
			Arsenic	5.9			mg/kg
			Barium	32.8			mg/kg
			Beryllium	0.22			mg/kg
			Cadmium	0.53			mg/kg
			Chromium	9.4			mg/kg
			Cobalt	6.9			mg/kg
			Copper	43.5			mg/kg
			Lead	42.4			mg/kg
			Mercury	0.28			mg/kg

Table 2-5. (continued)

Location	Sample Name	Sample Depth (feet)	Compound	Result	Qualifier	Modifier	Units
			Nickel	15.1			mg/kg
			Sulfide	166			mg/kg
			Vanadium	9			mg/kg
			Zinc	77.5			mg/kg

Qualifier

B *Result is between Method Detection Limit and Reporting Limit*

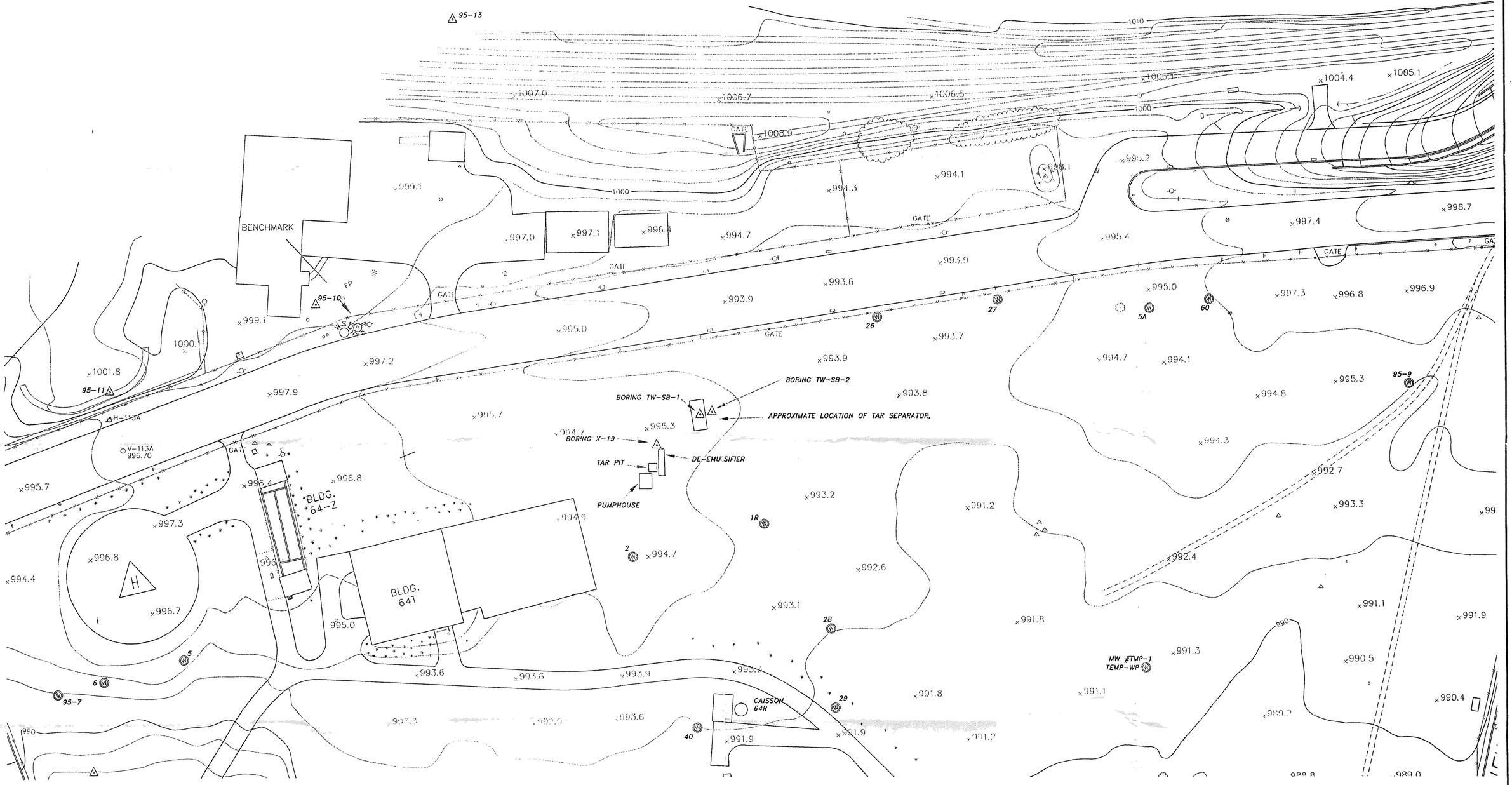


10/11/99

Figure 2-1 1953 Air Photo Showing Former MGP Structures

HSI GEOTRANS
A TETRA TECH COMPANY

9910est-a1.dwg



NOTE: MAPPING WAS PREPARED USING AERIAL PHOTOGRAPHS TAKEN IN APRIL, 1992. TOPOGRAHPY AND GENERAL LOCATIONS TAKEN FROM BLASLAND & BOUCK'S DRAWING NO.10193G03 DATED 6/29/92.

LEGEND

- BORING
- MONITORING WELL
- 988.8 LOCATION ELEVATION
- 990 ELEVATION CONTOUR (2-FOOT INTERVALS)

SCALE: 1" = 40

0 40 80 120 160

APPROXIMATE FORMER MGP STRUCTURES

EAST STREET AREA 2 SITE

GENERAL ELECTRIC CO.

CITY OF PITTSFIELD

BERKSHIRE COUNTY MASSACHUSETTS

No.	Description	Date	Checked By
REVISIONS			

Hill engineers architects planners
P.O. Box 293 ▪ 50 Depot Street ▪ Dalton, Ma. 01226 ▪ (413)684-0925
West Springfield, Ma. 01089 ▪ (413)788-7771

COMP. CODE:	BOOK NO.:	ACAD CODE:	DRAWING NO.
GE-1-18	FILE	GE-947-8	GE-947-8A
DATE:	DRAWN BY: CHECKED BY:	REV.	Figure 2-2
8/10/99	KTP		

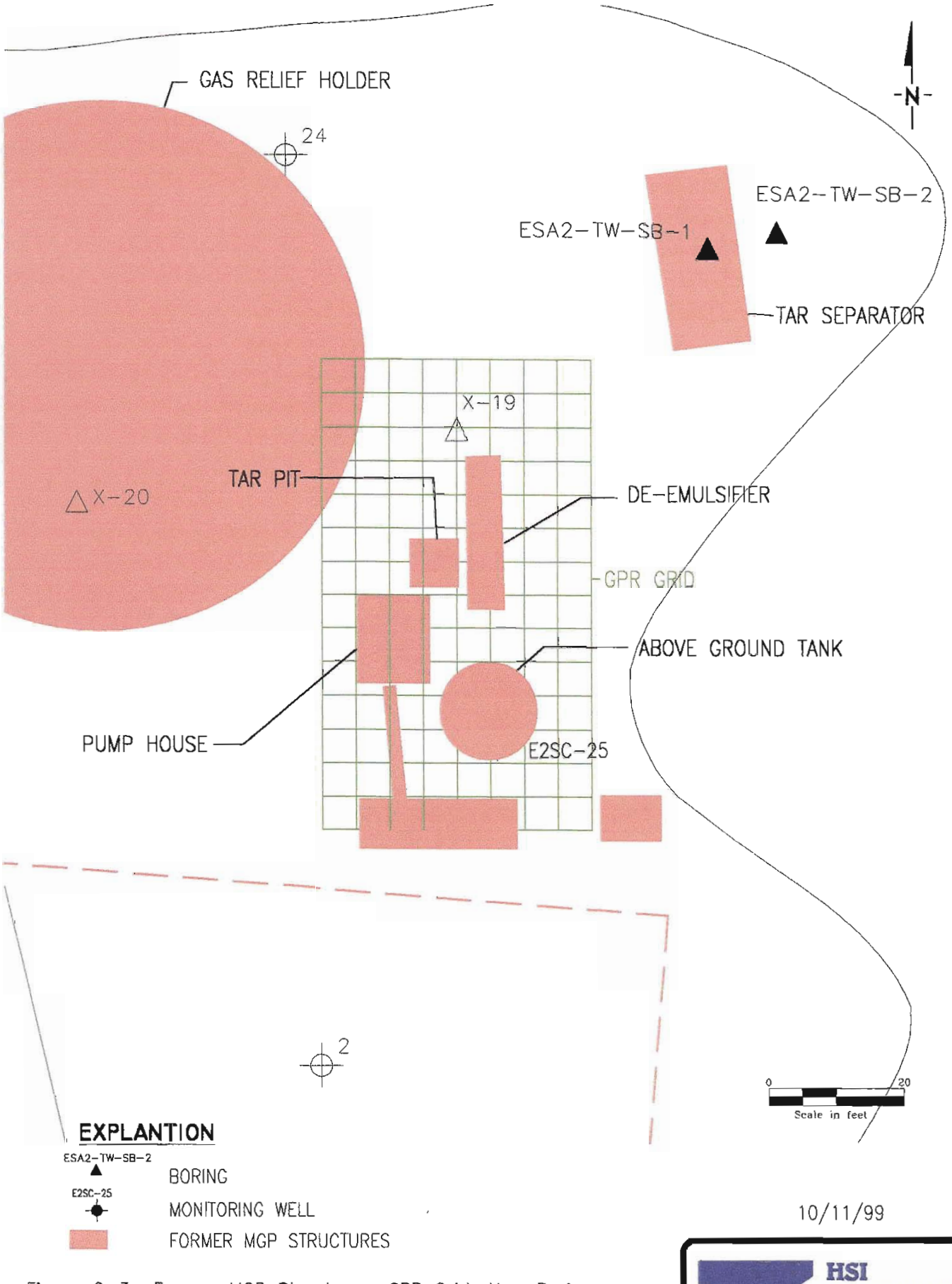
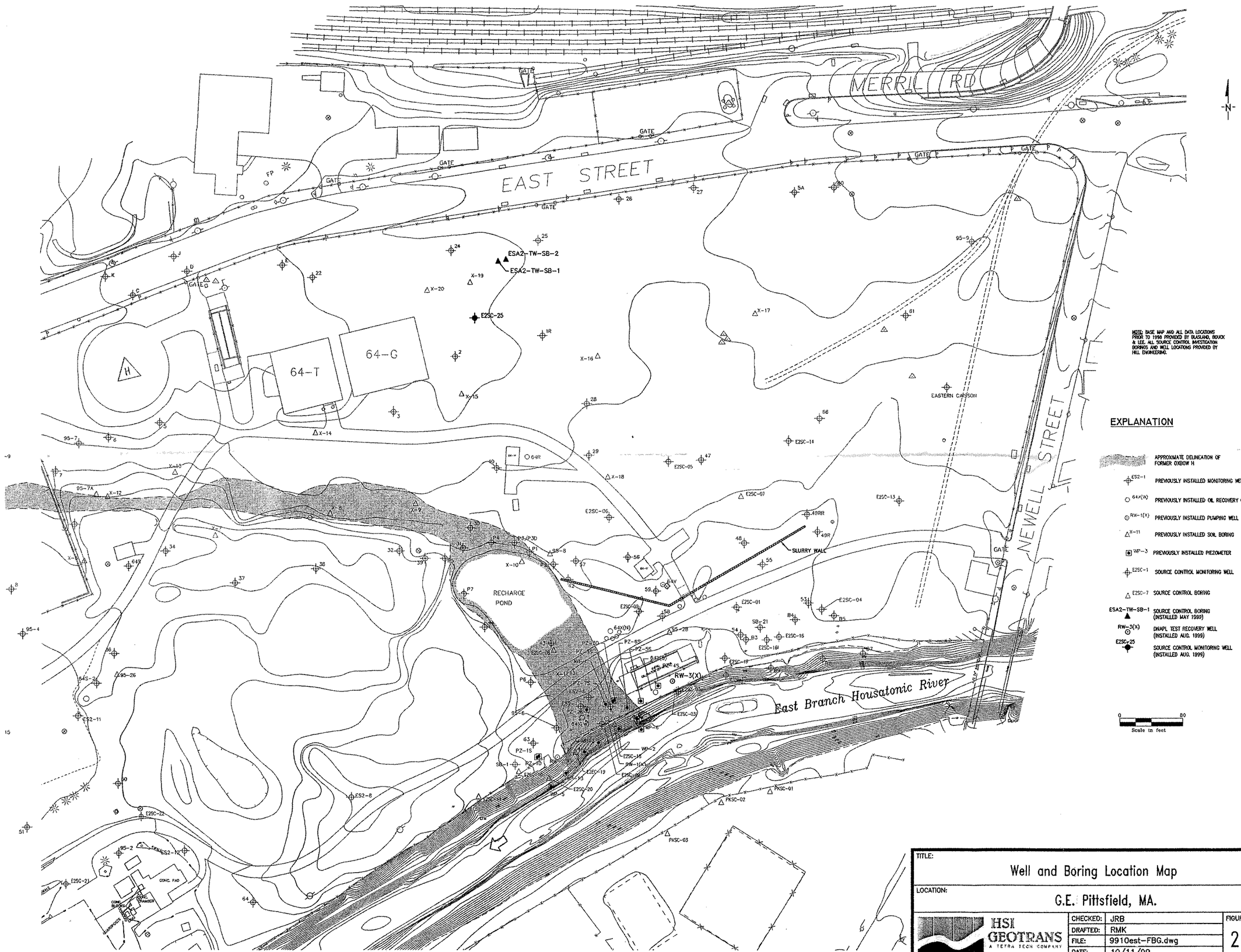


Figure 2-3 Former MGP Structures, GPR Grid, New Boring and Well Locations



TITLE: Well and Boring Location Map

LOCATION: G.E. Pittsfield, MA.

HSI GEOTRANS A TETRA TECH COMPANY

CHECKED:	JRB
DRAFTED:	RMK
FILE:	9910est-FBG.dwg
DATE:	10/11/99

FIGURE: 2-4

3 EVALUATION OF DNAPL RECOVERY

3.1 INSTALLATION OF RECOVERY WELL RW-3(X)

Between August 30 and September 13, 1999, recovery well RW-3(X) was installed near existing well E2SC-03I. Well E2SC-03I has shown the thickest accumulation of DNAPL in past investigations in this vicinity (HSI GeoTrans, 1999). E2SC-03I and RW-3(X) are located in the center of a depression in the till surface near the 64X recovery system. The location of RW-3(X) is shown on Figure 2-4. RW-3(X) was installed to determine if increased DNAPL recovery could be achieved from a larger diameter well with a larger screen slot size compared to that of monitoring well E2SC-03I. RW-3(X) is constructed of six-inch diameter schedule 80 PVC riser with an 80-slot stainless steel well screen. It was installed using the drive and wash method. Unconsolidated deposits above the till layer have been described in past investigations as well-graded medium to coarse sands and sandy gravels. An 80-slot screen was specified for RW-3(X) based on these descriptions.

Soil samples were not collected for chemical analysis from RW-3(X), since such data has been previously collected at the adjacent monitoring well E2SC-03I. However, samples were collected to confirm that the well was completed at the top of the till confining layer. After completing the installation of the recovery well, the location and ground surface elevation were surveyed relative to the 1927 Massachusetts State Plane Coordinate System and the 1929 National Geodetic Vertical Datum (NGVD). The drilling log and well construction diagram for RW-3(X) are included in Appendix A.

3.2 DNAPL MONITORING AND RECOVERY TESTING

3.2.1 PERIODIC DNAPL ELEVATION MONITORING

Since October 1998, water and DNAPL levels have been monitored frequently in several wells in the area of the recently installed recovery well RW-3(X). Table 3-1

summarizes the the water level and DNAPL level measurements that have been made in that area. Measurement of the relatively viscous DNAPL level in the monitoring wells has been difficult because the DNAPL is smeared on the inside of the monitoring well casing. This causes the monitoring probe to give inconsistent indications of the depth to DNAPL. Consequently, the measured elevations are considered to be approximate. Additionally, since the installation of downhole pumps in E2SC-3I and E2SC-17, it has been difficult to obtain DNAPL measurements due to the presence of tubing in the 2-inch diameter wells. On September 15 and 16, 1999, the elevation of the top of DNAPL in E2SC-03I was approximately six feet higher than previous measurements. The elevation of the top of DNAPL decreased again after pumping in subsequent days and has not risen above previously measured levels since then. It is suspected that the increased hydraulic pressure caused by the drilling of RW-3(X) between August 30 and September 13, 1999 caused additional DNAPL to flow into E2SC-03I resulting in the increased apparent thickness of DNAPL noted in that well.

Since May 1999, DNAPL has been removed regularly from wells E2SC-03I and E2SC-17. Table 3-2 summarizes the DNAPL removal from these two wells during the weekly monitoring and removal activities.

3.2.2 DNAPL Recovery Testing

Between March 29 and April 13, 1999, DNAPL pumping tests were initially conducted in monitoring wells E2SC-03I and E2SC-17. Results were reported in the April 1999 DNAPL Assessment (HSI GeoTrans, 1999). These pumping tests indicated that DNAPL recovery from these two-inch diameter monitoring wells could not be sustained at a rate adequate to enable installation of an automated recovery system. Therefore, RW-3(X) was installed with a larger (six-inch) diameter and an 80-slot screen zone.

To further evaluate the feasibility of DNAPL recovery, additional DNAPL recovery testing was performed on wells E2SC-03I and RW-3(X) between September 15 and 21, 1999.

The tests consisted of pumping DNAPL from the wells until water was observed in the discharge tubing and recording the volume of DNAPL removed. Pumping was stopped, the DNAPL level was allowed to recover, and then the wells were pumped again. Table 3-3 summarizes the pumping sequence and data recorded during the DNAPL recovery testing.

On September 15, 1999, 4.9 gallons of DNAPL were initially recovered from RW-3(X) and 0.6 gallons were recovered 3.25 hours later. No additional DNAPL recharge occurred that day. Five gallons were recovered each day on September 16 and 17. On both days, DNAPL recharge was limited after the initial pumping period. On the following day (September 20), only limited removal occurred due to clogging of the pump. DNAPL was pumped from RW-3(X) several times on September 21, 1999 and a total of 7.2 gallons were recovered on that day. One gallon was pumped at 8:45 AM and then the well was allowed to recharge for 3.25 hours. Six gallons were recovered at 12:00 PM. Another 0.2 gallons were recovered 2.75 hours later at 2:45 PM. The DNAPL recovery rate on September 21, 1999 averaged 1.03 gallons per hour after the initial one gallon was removed in the morning. The total volume of DNAPL recovered during the testing was 23.2 gallons. DNAPL recovery from RW-3(X) during the testing is shown graphically on Figure 3-1.

Four gallons of DNAPL were recovered from E2SC-03I on September 16 and two gallons were recovered on September 17, 1999. DNAPL was pumped from E2SC-03I several times on September 20, 1999. Three gallons were recovered initially at 8:45 AM and about two hours later another gallon was recovered. One-half gallon was recovered at 12:30 PM and another half gallon was recovered at 2:55 PM. On September 20, 1999, the DNAPL recovery rate averaged 0.33 gallons per hour after the initial three gallons were removed in the morning. On September 21, 1999 DNAPL was again pumped from E2SC-03I several times. Two and one-half gallons were recovered initially at 9:00 AM. One gallon was recovered after 1.5 hours at 10:30 AM. One-half gallon was recovered at 12:10 PM and another one-half gallon was recovered at 3:00 PM. On September 21, 1999, the DNAPL recovery rate averaged 0.33 gallons per hour after the initial 2.5 gallons were removed in the morning. The total volume of DNAPL recovered from well E2SC-03I during the testing was

15.5 gallons. DNAPL recovery from E2SC-03I during the testing is shown graphically on Figure 3-2.

DNAPL recovery rates from E2SC-03I on September 15, 16, 17, and 21 are comparable to those noted in the April 1999 DNAPL Assessment (HSI GeoTrans, 1999) on March 31, April 2, and 13, 1999. Recovery rates from six-inch recovery well RW-3(X) were higher than those obtained from two-inch monitoring well E2SC-03I.

Table 3-1. Water Level and NAPL Measurements, East Street Area 2

Location	Date Measured	Measuring Point Elevation	Depth to LNAPL	Depth to Water	Groundwater Elevation	LNAPL Thickness	Depth to DNAPL	DNAPL Elevation	Notes
E2SC-031									
	10/22/98	982.12		10.29	971.83		40.68	941.44	
	10/26/98	982.12		10.45	971.67		40.35	941.77	
	10/28/98	982.12		10.49	971.63		38.96	943.16	
	11/6/98	982.12		10.59	971.53		38.54	943.58	
	11/10/98	982.12		10.55	971.57		38.72	943.40	
	11/13/98	982.12		10.41	971.71		38.83	943.29	
	11/25/98	982.12		10.57	971.55		38.53	943.59	
	12/8/98	982.12		10.53	971.59		38.82	943.30	
	12/17/98	982.12		10.61	971.51		38.71	943.41	
	12/29/98	982.12		11.59	970.53		38.31	943.81	
	1/7/99	982.12		10.60	971.52		38.60	943.52	
	1/7/99	982.12		10.54	971.58		38.59	943.53	
	1/14/99	982.12		10.30	971.82		38.62	943.50	
	1/21/99	982.12		9.55	972.57		39.04	943.08	
	1/28/99	982.12		9.29	972.83		37.75	944.37	
	2/4/99	982.12		8.57	973.55		39.49	942.63	
	2/11/99	982.12		9.45	972.67		38.07	944.05	
	2/18/99	982.12		9.61	972.51		37.94	944.18	
	2/25/99	982.12		10.06	972.06		37.78	944.34	
	3/4/99	982.12		7.41	974.71		41.56	940.56	
	3/11/99	982.12		9.46	972.66		37.60	944.52	
	3/18/99	982.12		9.33	972.79		38.30	943.82	
	3/25/99	982.12		8.20	973.92		38.60	943.52	
	9/15/99	982.12		11.03	971.09		32.20	949.92	
	9/15/99	982.12					32.20	949.92	
	9/16/99 *	982.12		11.00	971.12		32.25	949.87	

Table 3-1. (continued)

Location	Date Measured	Measuring Point Elevation	Depth to LNAPL	Depth to Water	Groundwater Elevation	LNAPL Thickness	Depth to DNAPL	DNAPL Elevation	Notes
	9/16/99 *	982.12							
	9/16/99 *	982.12		10.28	971.84		42.70	939.42	
	9/17/99 *	982.12		8.38	973.74		42.20	939.92	
	9/17/99 *	982.12							
	9/17/99 *	982.12					47.25	934.87	
	9/20/99 *	982.12		9.86	972.26		38.00	944.12	
	9/20/99 *	982.12		9.78	972.34		43.79	938.33	
	9/20/99 *	982.12		9.79	972.33		44.25	937.87	
	9/20/99 *	982.12		10.27	971.85				
	9/20/99 *	982.12		9.80	972.32		43.77	938.35	
	9/21/99 *	982.12		10.06	972.06		38.82	943.30	
	9/21/99 *	982.12		10.00	972.12		43.78	938.34	
	9/21/99 *	982.12		10.10	972.02		44.75	937.37	
	9/21/99 *	982.12		10.02	972.10		45.01	937.11	
	9/30/99	982.12		10.00	972.12		39.12	943.00	
E2SC-03S									
	10/26/98	982.15		10.95	971.20				
	10/28/98	982.15		11.03	971.12				
	11/6/98	982.15		11.05	971.10				
	11/10/98	982.15		10.98	971.17				
	11/13/98	982.15		10.87	971.28				
	11/25/98	982.15		10.99	971.16				
	12/8/98	982.15		10.97	971.18				
	12/17/98	982.15		11.04	971.11				
	12/29/98	982.15		11.01	971.14				
	1/7/99	982.15		11.03	971.12				
	9/16/99 *	982.15		11.10	971.05				
	9/17/99 *	982.15		7.39	974.76				

Table 3-1. (continued)

Location	Date Measured	Measuring Point Elevation	Depth to LNAPL	Depth to Water	Groundwater Elevation	LNAPL Thickness	Depth to DNAPL	DNAPL Elevation	Notes
	9/30/99	982.15		10.50	971.65				
E2SC-17									
	10/28/98	985.38		13.59	971.79				
	11/4/98	985.38		13.66	971.72		47.90	937.48	
	11/6/98	985.38		13.65	971.73		47.75	937.63	
	11/9/98	985.38		13.66	971.72		47.70	937.68	
	11/13/98	985.38		13.46	971.92		47.57	937.81	
	11/25/98	985.38		13.67	971.71		46.61	938.77	
	12/8/98	985.38		13.65	971.73		45.07	940.31	
	12/17/98	985.38		14.71	970.67		43.85	941.53	
	12/29/98	985.38		13.66	971.72		43.83	941.55	
	1/7/99	985.38		13.79	971.59		44.17	941.21	
	1/7/99	985.38		13.64	971.74		43.95	941.43	
	1/14/99	985.38		13.39	971.99		44.05	941.33	
	1/21/99	985.38		12.71	972.67		44.35	941.03	
	1/28/99	985.38		12.30	973.08		44.29	941.09	
	2/4/99	985.38		11.76	973.62		44.26	941.12	
	2/11/99	985.38		12.49	972.89		44.17	941.21	
	2/18/99	985.38		12.65	972.73		44.00	941.38	
	3/4/99	985.38		11.93	973.45		44.26	941.12	
	9/16/99	985.38		13.01	972.37		43.00	942.38	
	9/23/99	985.38		12.89	972.49		42.35	943.03	
	9/30/99	985.38		13.19	972.19		44.10	941.28	
E2SC-25									
	8/25/99	997.06		21.97	975.09				
	9/2/99	997.06		22.20	974.86				

NOTES: 1) * indicates that measurements made during recovery tests.
2) Beginning in March 1999, wells E2SC-31 and E2SC-17 have been subject to weekly manual pumping, and DNAPL depth measurements have not been obtained due to the presence of tubing within the well.

Table 3-2. Weekly DNAPL Recovery, Monitoring Wells E2SC-03I and E2SC-17

LOCATION	DATE MONITORED	DNAPL RECOVERED (Gallons)
E2SC-03I		
	1/7/99	0.79
	1/14/99	0.18
	1/21/99	0.24
	1/28/99	0.37
	2/4/99	0.32
	2/11/99	0.34
	2/18/99	0.34
	2/25/99	0.11
	3/4/99	0.40
	3/11/99	0.12
	3/18/99	0.13
	3/25/99	0.13
	4/1/99	1.85
	4/8/99	1.59
	4/15/99	1.85
	4/22/99	1.45
	5/6/99	2.00
	5/13/99	1.59
	5/20/99	1.19
	5/27/99	1.85
	6/3/99	2.97
	6/10/99	NR
	6/17/99	NR
	6/24/99	NR
	7/8/99	1.28
	7/15/99	1.27
	7/22/99	1.32
	7/29/99	2.77
	8/5/99	2.51
	8/12/99	2.51
	8/19/99	2.51
	8/26/99	0.50
	9/2/99	2.91
	9/9/99	2.38
	9/23/99	1.85
	9/30/99	2.38

Table 3-2. (continued)

LOCATION	DATE MONITORED	DNAPL RECOVERED (Gallons)
E2SC-17		
	1/7/99	0.53
	1/14/99	0.42
	1/21/99	0.32
	1/28/99	0.26
	2/4/99	0.26
	2/11/99	0.32
	2/18/99	0.26
	2/25/99	0.20
	3/4/99	0.53
	3/11/99	0.20
	3/18/99	0.79
	3/25/99	1.06
	4/1/99	0.03
	4/8/99	1.06
	4/15/99	1.06
	4/22/99	0.13
	5/6/99	NR
	5/13/99	NR
	5/20/99	NR
	5/27/99	NR
	6/3/99	0.11
	6/10/99	NR
	6/17/99	NR
	6/24/99	NR
	7/8/99	0.48
	7/15/99	0.16
	7/22/99	0.13
	7/29/99	0.21
	8/5/99	0.05
	8/12/99	0.03
	8/19/99	0.03
	8/26/99	0.01
	9/2/99	0.01
	9/9/99	0.01
	9/23/99	0.53
	9/30/99	0.92

Notes:
Any DNAPL present was pumped
NR - No DNAPL recovered

Table 3-3. DNAPL Recovery Test. Montoring Well E2SC-03I and Recovery Well RW-3(x)

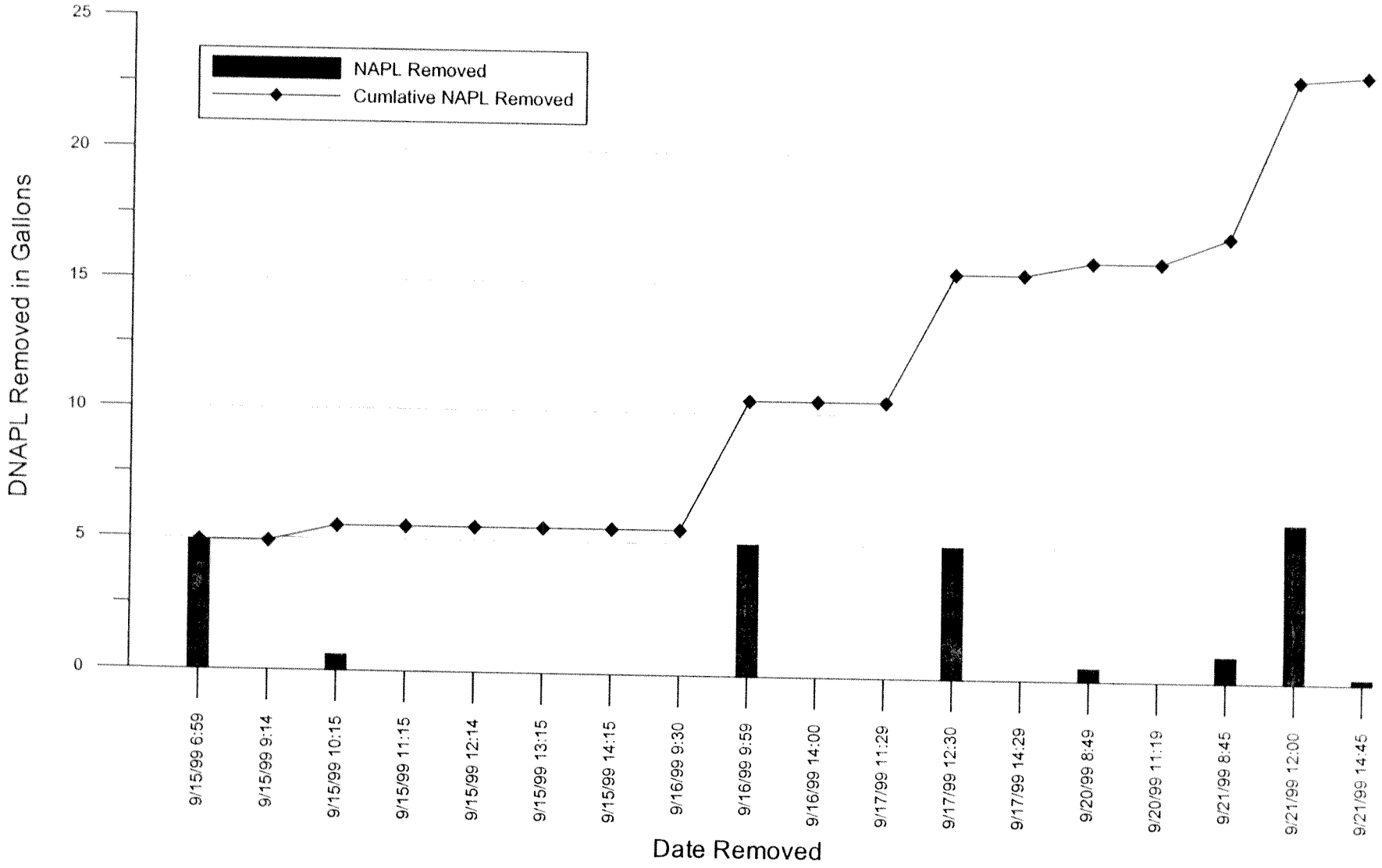
LOCATION	DATE MONITORED	TIME	DEPTH TO DNAPL (ft)	DNAPL RECOVERED (Gallons)
E2SC-03I				
	9/16/99	9:45:00 AM	32.25	
	9/16/99	11:30:00 AM		4.00
	9/16/99	2:15:00 PM	42.70	
	9/17/99	12:05:00 PM	42.20	
	9/17/99	1:30:00 PM		2.00
	9/17/99	2:45:00 PM	47.25	
	9/20/99	8:45:00 AM	38.00	3.00
	9/20/99	10:40:00 AM	43.79	1.00
	9/20/99	12:30:00 PM	44.25	0.50
	9/20/99	12:40:00 PM		
	9/20/99	2:55:00 PM	43.77	0.50
	9/21/99	9:00:00 AM	38.82	2.50
	9/21/99	10:30:00 AM	43.78	1.00
	9/21/99	12:10:00 PM	44.75	0.50
	9/21/99	3:00:00 PM	45.01	0.50
	Note: Bottom of well corresponds to a depth of 47.35			
RW-3(x)				
	9/15/99	7:00:00 AM	42.20	4.90
	9/15/99	9:15:00 AM	44.00	
	9/15/99	10:15:00 AM	43.90	0.60
	9/15/99	11:15:00 AM	44.00	
	9/15/99	12:15:00 PM	44.00	
	9/15/99	1:15:00 PM	44.00	
	9/15/99	2:15:00 PM	44.00	
	9/16/99	9:30:00 AM	42.00	
	9/16/99	10:00:00 AM		5.00
	9/16/99	2:00:00 PM	43.70	
	9/17/99	11:30:00 AM	41.75	
	9/17/99	12:30:00 PM	44.00	5.00
	9/17/99	2:30:00 PM	44.00	
	9/20/99	8:50:00 AM	39.91	0.50
	9/20/99	11:20:00 AM	39.80	Pump clogged

Table 3-3. (continued)

LOCATION	DATE MONITORED	TIME	DEPTH TO DNAPL (ft)	DNAPL RECOVERED (Gallons)
	9/21/99	8:45:00 AM	39.42	1.00
	9/21/99	12:00:00 PM	40.30	6.00
	9/21/99	2:45:00 PM	43.63	0.20

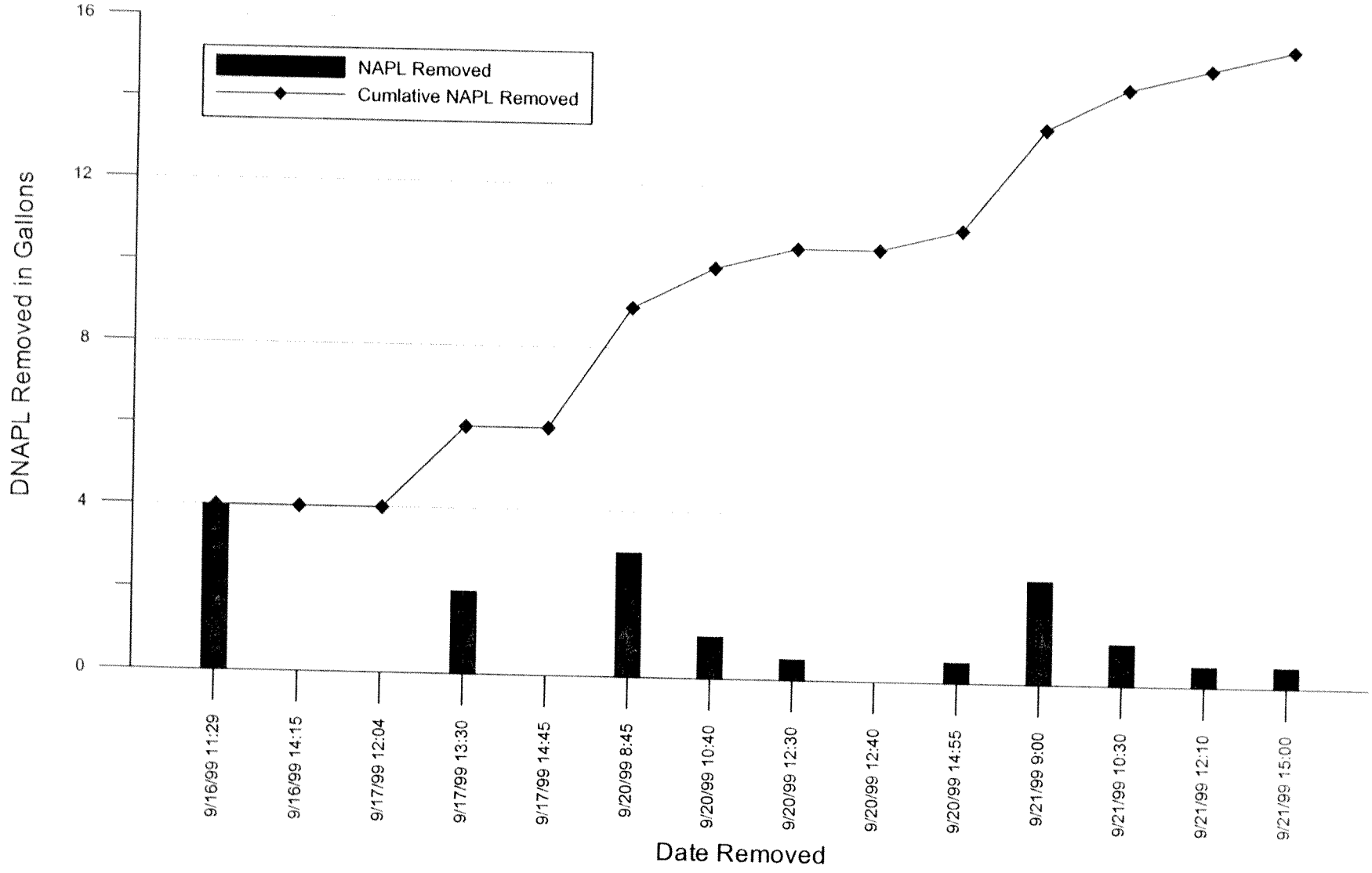
Notes: 1) Bottom of well corresponds to a depth of 47.35
2)Weekly manual pumping removed 5 gallons of DNAPL from RW-3(x) on 9/30/99

Figure 3-1. DNAPL Recovery: Well RW-3(X)



NOTE: The Pump was clogged on 9/20/99

Figure 3-2. DNAPL Recovery: Well E2SC-03I



NOTE: The Pump was clogged on 9/20/99

4 CONCLUSIONS AND RECOMMENDATIONS

Based on these additional investigations, it appears that an automated DNAPL pumping system may be feasible in recovery well RW-3(X). However, because GE experienced difficulty with the QED pulse pump becoming clogged, a "piston-type" pump has been ordered and will be installed in the well within approximately two weeks for evaluation. Pending the satisfactory operation of this pump and agency approval of this recommendation, GE anticipates submitting a design for the automated pumping system in RW-3(X). This design will be submitted within approximately four weeks after receipt of agency approval of this report. In the meantime, RW-3(X) will be added to the weekly manual pumping, along with wells E2SC-3I and E2SC-17.

5 REFERENCES

1. Col-East, 1953 Aerial Photograph.
2. Hill, 1999, Approximate Tar Structures Locations, August 10, 1999.
3. HSI GeoTrans, 1999, DNAPL Assessment, East Street Area 2 Site, April 28, 1999.
4. U. S. EPA, June 28, 1999 Conditional Approval letter regarding HSI GeoTrans report titled DNAPL Assessment, East Street Area 2 Site.

APPENDIX A

BORING LOGS

Date Start/Finish: 5/27/99 - 5/27/99
Drilling Company: BBL
Driller's Name: Alex Marconi
Drilling Method: Direct Push
Bit Size: NA **Auger Size** : NA
Rig Type: AMS Power Probe 9600
Spoon Size:
Hammer Weight: NA
Height of Fall: NA

Northing: 534023.17255
Easting: 133182.70791
Borehole Depth: 14 ft.
Ground Surface Elev.: 994.00 ft.

Descriptions by: Stephen Lewitt

Boring No. ESA2-TW-SB-1

Client:
General Electric Company

Site:
East Street Area 2
Pittsfield, Massachusetts

DEPTH	ELEVATION	Sample Interval	Spoon Size (in,OD)	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
gs elevation 994.00 ft											
										GROUND SURFACE	
		(0-1')		NA	NA	1.0	0.2			Dark brown fine SAND and SILT, little coarse Sand, trace fine Gravel, dry.	
		(1-2')		NA	NA	1.0	0.2			Dark brown fine-coarse SAND, little Silt, trace fine Gravel, dry.	
		(2-4')		NA	NA	1.15	0.5			Black fine-coarse SAND, little Silt, trace fine Gravel, hydrocarbon odor, bluish sheen, moist.	Hydrated bentonite seal from 0.0' to 14.0' bgs
	990										
5		(4-6')		NA	NA	1.15	31.5				
		(6-8')		NA	NA	1.25	112			Black fine SAND, some medium-coarse Sand, little Gravel, rainbow sheen, wet.	
	985	(8-10')		NA	NA	1.25	155			Black fine-coarse SAND and GRAVEL, rainbow sheen, wet.	
10											
		(10-14')		NA	NA	0.25	31.2			Black fine SAND and SILT, trace coarse Sand, sheen, wet.	
	980										
15										Boring terminated at 14.0' bgs.	

BBL
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engineers & scientists

Remarks:
Appendix IX+3 (excluding herbicide/pesticide) sample at 8-10' interval. PCB samples collected at each sample interval. NA: Not Available

Saturated Zones

Date / Time	Elevation	Depth

Date Start/Finish: 5/27/99 – 5/27/99
Drilling Company: BBL
Driller's Name: Alex Marconi
Drilling Method: Direct Push
Bit Size: NA **Auger Size** : NA
Rig Type: AMS Power Probe 9600
Spoon Size:
Hammer Weight: NA
Height of Fall: NA

Northing: 534025.59020
Easting: 133172.97279
Borehole Depth: 16 ft.
Ground Surface Elev.: 993.80 ft.

Descriptions by: Stephen Lewitt

Boring No. ESA2-TW-SB-2

Client:
General Electric Company

Site:
East Street Area 2
Pittsfield, Massachusetts

DEPTH	ELEVATION	Sample Interval	Spoon Size (in,OD)	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
	Ground elevation 993.80 ft									GROUND SURFACE	
		(0-1')		NA	NA	1.0	NA			Dark brown fine SAND and SILT, little medium-coarse Sand, trace fine Gravel, dry.	
		(1-2')		NA	NA	1.0	NA				
		(2-4')		NA	NA	1.5	NA			Red-brown fine SAND and SILT, little medium-coarse Sand, trace fine Gravel, dry.	Hydrated bentonite seal from 0.0' to 16.0' bgs
	990										
5		(4-6')		NA	NA	1.0	NA				
		(6-8')		NA	NA	1.0	NA			Black fine SAND, little medium-coarse Sand trace Silt, hydrocarbon odor, dry.	
	985	(8-10')		NA	NA	1.0	NA				
10		(10-12')		NA	NA	1.5	NA			Black fine SAND, little medium-coarse Sand, trace Silt, strong hydrocarbon odor, bluish sheen, tar residue, wet.	
		(12-14')		NA	NA	2.0	NA			Black fine SAND, little medium-coarse Sand, trace Silt, Clay, organics, and brick debris, strong hydrocarbon odor, sheen, and tar residue, wet	
	980										
15		(14-16')		NA	NA	1.0	NA				

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Remarks:
NA: Not Available bgs:below ground surface

Saturated Zones

Date / Time	Elevation	Depth

Site:
East Street Area 2
Pittsfield, Massachusetts

Client:
General Electric Company

Boring No. ESA2-TW-SB-2

Total Depth = 18 ft.

DEPTH	ELEVATION	Sample Interval	Spoon Size (in,OD)	Blows/6 In.	N	Recovery (ft.)	PID (ppm) Headspace	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
		(14-16')		NA	NA	1.0	NA			Same as above, wet	
										Boring terminated at 16.0' bgs.	
	975										
20											
	970										
25											
	965										
30											
	960										
35											

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Remarks:

Saturated Zones

Date / Time	Elevation	Depth

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER	P009-001	BORING/WELL NUMBER	E2SC-25
PROJECT NAME	Source Control Upper Reach Housatonic River	DATE DRILLED	8/16/99
LOCATION	Pittsfield, Massachusetts	CASING TYPE/DIAMETER	2 PVC
DRILLING METHOD	HSA	SCREEN TYPE/SLOT	.010 Slot 2 PVC
SAMPLING METHOD	SS	GRAVEL PACK TYPE	#0 Silica Sand
GROUND ELEVATION	994.81	GROUT TYPE/QUANTITY	Portland/Volclay
TOP OF CASING	997.06	DEPTH TO WATER	
LOGGED BY	NSB	GROUND WATER ELEVATION	NM
NORTHING	533951	EASTING	133131.2

FID (ppm)	BLOW COUNTS	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DISCRIPTION	CONTACT DEPTH
0.5	6 9	SS01					Top 0.25 loose, Dusky Brown to Dark yellowish Brown, fine SAND w/ some organics, little gravel, dry, poorly gradded, subround, (Topsoil). Bottom 0.25 loose, Very pale Orange, SAND and GRAVEL, dry, poorly graded, (Fill).	1.0
8	7 13 31 50/.1	SS02						
100	50/.2	SS03					Dense, Dark yellowish Brown, SAND and COAL SLAG, dry, subangular, (Fill).	3.0
24	2 2	SS04		5			Dense, Dark yellowish Brown, SAND w/ few tar, gravel, dry, poorly graded, subangular, (Fill).	5.0
5	9 13 9 9	SS05					Loose, Light olive Grey, medium SAND w/ little gravel, moist, poorly graded, (SP).	6.0
4	4 6 5	SS06					Top 1.5 Similar to above except w/ Fe staining. Bottom 0.3 medium dense, Moderate olive Brown, SILT and SAND, moist, poorly graded, (SP). Similar to above (Bottom) except laminated.	8.0
4	2 3 2 3	SS07		10			Same as above.	10.0
86	4 5 6 7	SS08					Top 0.5 loose, Moderate olive Brown, SILT, moist, well graded, (ML). Middle 0.7 medium dense, Greyish Black, fine SAND and SILT, moist, well graded, (SW). Bottom 0.3 loose, Medium light Grey, coarse SAND, moist, poorly graded, (SP).	12.0
110	5 7	SS09						14.0
100	8 9 9 9	SS10		15			Same as above (Bottom). Similar to above except w/ little gravel.	15.0
100	7 8 9 15	SS11					Same as above, cobble in tip.	17.0
120	7 16 35 45	SS12					Similar to above except w/ sheen.	19.0
60	26 21 16 12	SS13		20			Dense, Medium Grey, GRAVEL w/ little silt, wet, poorly graded, sheen, (GM).	21.0
6	3 4 9 13	SS14					Similar to above except w/ few silt.	23.0
2	7 8 12 14	SS15		25			Similar to above except w/ little sand.	25.0
1	13 13 13 12	SS16					Medium dense, Medium dark Grey, medium SAND and GRAVEL w/ trace silt, wet, poorly graded, subangular, (SW).	27.0
1	13 11 10 9	SS17		30			Similar to above except w/ some staining.	29.0
0	10 18 15 14	SS18					Same as above.	31.0
7	21 31 18 26	SS19					Similar to above except w/ little coarse gravel, some staining.	33.0
				35				35.0

Continued Next Page

WELL DIAGRAM

Portland / Volclay Grout

Bentonite Seal

#0 Filter Sand
.010 Slot 2 PVC
Schd 40 Screen

J HSI_MA.GDT 9/28/99

BORING_WELL_F

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A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001 **BORING/WELL NUMBER** E2SC-25

PROJECT NAME Source Control Upper Reach Housatonic River **DATE DRILLED** 8/16/99

Continued from Previous Page

FID (ppm)	BLOW COUNTS	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DISCRIPTION	CONTACT DEPTH	WELL DIAGRAM
20		SS20					Medium dense, Dark Grey, coarse SAND and GRAVEL w/ trace silt, wet, poorly graded, sheen, (SW).		
30		SS21					Very dense, Light olive Grey, COBBLE w/ little silt, wet, poorly graded, trace product, (GW).	37.0	
5		SS22					Top 0.1 Same as above. Bottom 1.7 Very dense, Moderate olive Brown, SILT and GRAVEL w/ trace clay, sand, moist, poorly graded, angular to sub angular, (Till).	38.0	1' 2 PVC Schd 40 Sump
				40				40.0	Cave in

BORING WELL F... J HSI MA GDT 9/28/99

HSI GEOTRANS
A TETRA TECH COMPANY

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001
PROJECT NAME Source Control Upper Reach Housatonic River
LOCATION Pittsfield, Massachusetts
DRILLING METHOD Drive and Wash
SAMPLING METHOD SS
GROUND ELEVATION 980.93
TOP OF CASING 980.28
LOGGED BY MJJ/NSB
NORTHING 533486.57

BORING/WELL NUMBER RW-3(X)
DATE DRILLED 9/10/99
CASING TYPE/DIAMETER 6" PVC
SCREEN TYPE/SLOT .080 Slot SS
GRAVEL PACK TYPE D30 = 5mm
GROUT TYPE/QUANTITY Portland/Volclay
DEPTH TO WATER 9.32'
GROUND WATER ELEVATION NM
EASTING 133387.39

FID (ppm)	BLOW COUNTS	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DISCRIPTION	CONTACT DEPTH	WELL DIAGRAM
				5			No samples taken see Log of E2SC-03 for lithologic description.		Portland / Volclay Grout; 6" Schd 80 PVC Riser; Bentonite Seal
				10					
				15					
				20					
				25					
				30					
				35					

Continued Next Page

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER P009-001 **BORING/WELL NUMBER** RW-3(X)

PROJECT NAME Source Control Upper Reach Housatonic River **DATE DRILLED** 9/10/99

Continued from Previous Page

FID (ppm)	BLOW COUNTS	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DISCRIPTION	CONTACT DEPTH	WELL DIAGRAM
				40					D30 = 5mm Gravel Pack .080 Slot SS Wire Wraped Screen
NM	NA	SS01		45			Dense, light to medium olive Brown, sandy SILT w/ few gravel, moist, well graded, angular, Till.	45.0	
								47.0	1' SS Sump Bottom Bentonite Seal

BORING_WELL_P J:\HSI_MA.GDT 9/28/99

APPENDIX B

GEOPHYSICAL SURVEY REPORT, GEOPHYSICAL APPLICATIONS, INC., SEPTEMBER 27, 1999

GEOPHYSICAL
APPLICATIONS
INCORPORATED

September 27, 1999

Mr. John D. Ciampa
GENERAL ELECTRIC COMPANY
100 Woodlawn Avenue
Pittsfield, MA 01201

Subject: Geophysical Survey Report
East Street Area 2
Pittsfield, Massachusetts

Dear Mr. Ciampa:

The enclosed report describes a geophysical survey performed at the above-noted site. Field work was performed on August 3, 1999. The primary purpose of this survey was to identify possible buried objects near boring location X-19.

The geophysical survey method utilized was ground penetrating radar (GPR) profiling, as described below.

METHODS OF INVESTIGATION

Survey Control

A reference grid was established throughout the survey area before conducting geophysical data acquisition. The grid was denoted by spray paint marks located at 10-foot intervals.

Ground Penetrating Radar (GPR)

GPR profiling is based on the principle that materials with contrasting electrical properties reflect radar signals back to the ground surface. Concrete and electrically-conductive materials generally produce high-amplitude GPR reflections. Plotting observed reflections on a base map typically enables an interpreter to identify the lateral extent of concrete structures or other electrically-conductive materials.

GPR data were recorded using a GSSI model SIR-3 radar instrument with a 500 MHz antenna. Radar profiles were recorded along traverses located 5 feet apart, and displayed on a black-and-white chart recorder for immediate inspection and preliminary interpretation.

The horizontal scale on each GPR record was determined by the speed at which the antenna was pulled along a traverse. Survey stations were noted by pressing a marker button as the antenna passed each grid node. The vertical scale of radar cross sections recorded during this survey was 60 nanoseconds. This time interval was selected to be greater than the anticipated maximum two-way travel time during which GPR reflections might be observed.

125 Washington Street • Suite Two • Foxboro • MA • 02035
508-543-1388 • FAX 508-543-1019

SURVEY LIMITATIONS

GPR signal penetration is site specific, determined by dielectric properties of local soil or fill materials. Maximum GPR signal penetration was estimated to vary between 1 and 6 feet below ground surface, based on observed reflection travel times and typical GPR signal-propagation velocities. Objects deeper than the GPR signal's maximum penetration depth will not be detected by the survey.

GPR interpretations are based on identifying reflection patterns from subsurface objects. Profiling along perpendicular traverses helps determine the size and shape of buried objects.

Varying a GPR antenna's speed along a survey traverse can cause slight errors in horizontal distance interpolations and inferred object positions. Distance interpolation errors were minimized during this survey by using 10-foot distance marks.

GPR is most likely to detect electrically-conductive soils or backfill materials, and concrete or metallic objects. Plastic or vitreous-clay pipes, or fiberglass USTs, are unlikely to be detected with GPR.

RESULTS

Figure 1 shows GPR survey coverage and interpretations in the project area. GPR signals exhibited relatively poor penetration at the northwest corner of the survey grid. According to historical facility drawings and photographs, this area appears to correspond with the location of a former gas relief holder associated with prior Berkshire Gas operations on this property. Along the southeast edge of this poor-penetration area, a subsurface layer dips downwards toward the southeast to a depth of a few feet below ground surface.

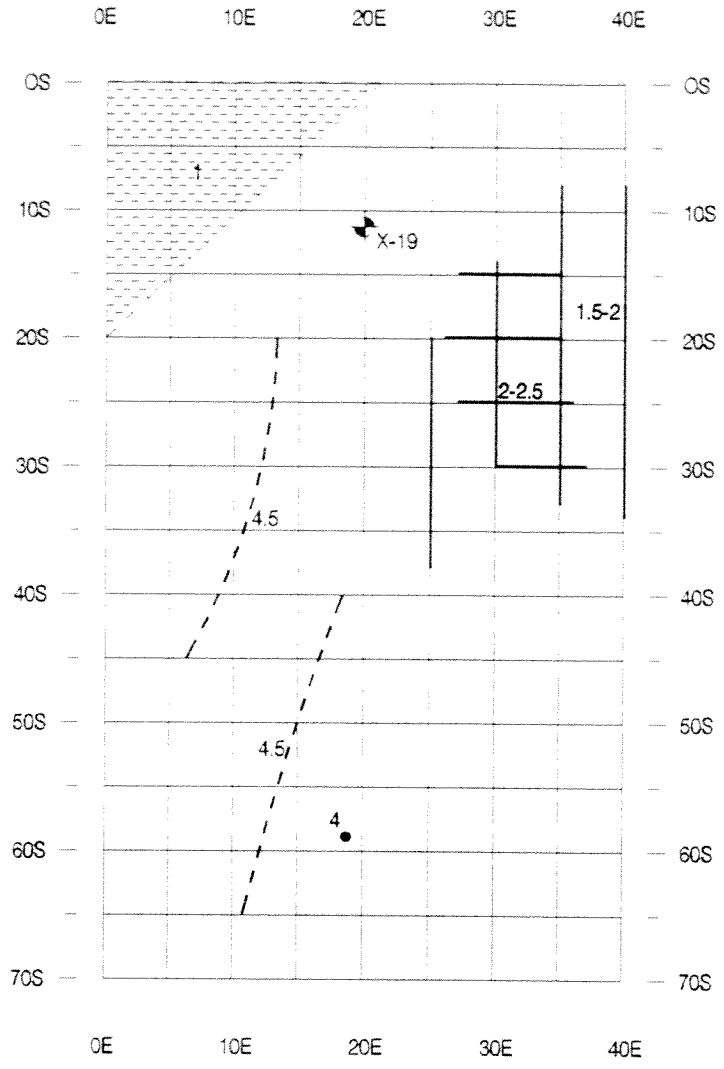
Two linear trends were identified approximately 4.5 feet below ground surface. Both objects trend in a north-south direction, as shown on Figure 1.

Between Stations 8S to 35S and 25E to 40E there are strong GPR reflectors between 1.5 to 2.5 feet deep. These reflections may represent electrically-conductive soils or backfill, or a buried concrete slab (or similar structure). According to historical facility drawings and photographs, this area generally corresponds to the location of former tar processing equipment. No subsurface structures were identified beneath the location of boring X-19, within the GPR survey's penetration depth.

Sincerely,

GEOPHYSICAL APPLICATIONS, INC.

99297 - 99297b.rpt



North (approximate)

EXPLANATION

- GPR traverse
- 2-2.5 GPR reflection greater than two feet wide (interpreted depth in feet)
- 4 GPR reflection less than two feet wide (interpreted depth in feet)
- 4 GPR linear trend less than two feet wide (interpreted depth in feet)
- GPR poor penetration (interpreted depth in feet)
- X-19 Existing boring

0 15

feet

98297 - 98297.dwg
last modified 8/26/99

GEOPHYSICAL APPLICATIONS INCORPORATED

Figure 1
GPR Traverse Locations and Interpretations
East Street Area 2
Pittsfield, Massachusetts